Preface

This report is one of a series of operations reports written for the United States National Science Foundation (NSF) Office of Polar Programs, Ultraviolet Spectroradiometer Network, now in its 16th year of operation. The report is intended to complement Volume 12.0 network data that have been measured in 2002 and 2003. Like the Operations Reports of Volume 7 – 11 , this report is also made available in pdf-format on the project's website at www.biospherical.com/NSF.

The Antarctic "ozone hole" in the austral fall of 2002 was one of the smallest since 1988. According to the World Meteorological Organisation, the maximum total area in late September was about 19 million km^2, which is considerably less than the area of 26.5 million km^2 observed in 2001. The ozone hole dissolved by early-November, one of its earliest disappearances since more than a decade. The small size and early disappearance can be attributed to the occurrence of a comparatively large number of "planetary waves," which lead to a warming of the lower stratosphere. Warmer stratospheric temperatures lead in turn to a lower frequency of Polar Stratospheric Clouds, which help to transform inactive forms of chorine to ozone-destroying active forms. It should be pointed out that the small hole in 2002 is not an indication that the ozone layer is recovering. The small size is rather caused by an unusual global weather pattern in 2002.

This volume is the first volume discussing data from GUV moderate-bandwidth, multi-channel radiometers, which were installed next to the SUV-100 spectroradiometers at several network sites during the reporting period. These instruments provide measurements at several approximately 10 nm wide wavelength bands in the UV. An additional channel measures Photosynthetically Active Radiation. Data from the GUV radiometers are made available in near real time at the project's web site and are also used for quality control of SUV-100 measurements.

The methods used for data processing of SUV-100 data were essentially the same as implemented for Volumes 7 – 11. In order to reduce the number of data media, measured solar spectra ("Composite Scans") were compressed and are stored in zip-format on the Volume 12.0 CD-ROM.

We want to emphasize that a new data version of the entire data set of the NSF UV Monitoring network is currently being generated. This new data set is named "Version 2" and will eventually supersede the "Version 0" data set discussed in this report. Version 2 data are corrected for the instruments' cosine errors, wavelength errors, which mostly affected earlier network data, and step changes caused by modifications to the instruments. Version 2 data therefore have a higher accuracy than Version 0 data. They also feature a larger number of data products, such as total column ozone, effective albedo, and cloud optical depth. In addition, each measured UV spectrum is complemented with a model spectrum that has been calculated with a radiative transfer model. These model spectra are required for the various corrections and also serve as reference clear-sky spectra during cloudy conditions. More about the new Version 2 data set can be found at the Version 2 website at www.biospherical.com/NSF/Version2.

We would like to express our appreciation to all researchers that have utilized and published data from the NSF UV Network (see Appendix Section A2. "References"). We are always looking for publication references in which the network's data have been used. We are especially grateful to those who offered feedback on methods, algorithms, and data products. We continue to encourage this input and welcome suggestions on how we can further meet the needs of the scientific community. An easy-to-use feedback form can be found on the project's website at www.biospherical.com/NSF.

To contact Biospherical Instruments Inc.:
5340 Riley Street
San Diego, CA 92110-2621
Phone: (619) 686-1888
Fax: (619) 686-1887
www.biospherical.com
For project data inquiries, please send an e-mail to *nsfdata@biospherical.com*

Acknowledgements

The need for the rapid establishment of the UV monitoring program was identified by Dr. Peter Wilkniss, Director, Division of Polar Programs, National Science Foundation in 1987. Dr. Polly Penhale (NSF) and Dr. Sue Weiler (NSF/OPP Consultant) have guided this project.

Garry Harris from Research Instrument Systems was commissioned by NSF/OPP in the fall of 1987 to design and build the precursor to the SUV-100. Four instruments were manufactured between October 1987 and January 1988, and two were deployed at McMurdo Station and the South Pole in February 1988. In the original configuration no publishable data were produced by the two instruments, and both were substantially redesigned by Biospherical Instruments Inc. during the following season.

Key Contributors

This activity was funded by the National Science Foundations Office of Polar Programs prime contracts OPP-89-22832 and OPP 0000373, and subcontracts SCB -RM-77540-01, RM77541-02, RM-92311, and 4500097725 to Raytheon Polar Services Company (RPSC). Special thanks to J. Alcorta, S. Dunbar, R. Edwards, S. Hoskins, S. Kottmeier, and Jill Strzok of RPSC who worked with us on a daily basis in making our accomplishments possible.

We gratefully acknowledge the operators who keep our instruments running under the most adverse of conditions on Earth – without them, this project would not be possible. McMurdo operators for this period include Laura Tudor and Seth White. The installation at Palmer Station was operated by John Booth, Glenn Grant, and Jeff Otten. South Pole operators for the period of this report include John Booth and Daren Blythe. All operators were affiliated with RPSC.

Susana Díaz of CONICET manages Ushuaia's operation, with assistance of G. Deferrari. Dr. E. Olivero, the current director of CADIC, provides facilities and personnel support. Former director Dr. J. Rabassa made this installation possible.

NOAA/CMDL personnel Daren Blythe, Glen McConville, Dan Endres, and Don Neff generously provide assistance in the operation of the Barrow system. Dale Stotts of the Ukpeagvik Inupiat Corporation (UIC), and Dr. J. Kelly and J. Sonderup of PICO aided in the original establishment of the system.

We extend our gratitude to Patrick Disterhoft of NOAA's Central Ultraviolet Calibration Facility (CUCF) and the University of Colorado, Boulder, for providing calibration standards and auditing our irradiance scale.

Dr. R. McPeters and Dr. J. Herman of NASA/GSFC provided TOMS Total Ozone data for comparison purposes. We express our thanks to Dr. H. Slaper from the National Institute of Public Health and the Environment (RIVM), The Netherlands, for providing software for the Fraunhofer correlation method.

Personnel at Biospherical Instruments

The Principal Investigator for the project is C. R. ("Rocky") Booth, the Chief Executive Officer and Research Director of Biospherical Instruments Inc. The Co-Principal Investigator is Dr. Germar Bernhard, an Atmospheric Physicist and UV researcher who joined Biospherical Instruments Inc from the Fraunhofer Institute for Atmospheric Environmental Research (IFU) of Garmisch-Partenkirchen, Germany. He is responsible for quality control and scientific analysis of data from the network. The Project Manager is James ("Jim") C. Ehramjian, and he is responsible for the project's operational activities. Vi Quang joined the group in 1999 as Data Analyst/Database Administrator performing data analysis, database development, programming, and website development.